December 20, 2006

Mr. Christopher M. Crane
President and Chief Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
Dresden Nuclear Power Station
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3
NRC INSPECTION REPORT 072-00037/06-01(DNMS)

Dear Mr. Crane:

On December 12, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed its inspection activities at the Dresden Nuclear Power Station. The purpose of this routine inspection was to determine whether the dry cask storage pad was designed in accordance with applicable regulations and whether the HI-STORM 100 overpack and the storage pad construction activities were conducted safely and in accordance with NRC requirements and design specifications. At the conclusion of the inspection on December 12, 2006, during an exit teleconference, the inspector discussed the final inspection findings with members of your staff.

Onsite activities consisted of observation of placement of structural fill, placement of reinforcement, and placement of concrete in a storage overpack and the pad. The inspection also consisted of an in-office review of structural calculations related to the storage pad and the haul path as well as reviews of the final concrete quality test results and material certifications. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities in progress, and interviews with personnel.

Based on the results of these inspections, the NRC did not identify any violations. The HI-STORM 100 overpack and storage pad construction activities were conducted in accordance with applicable regulations and license conditions.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's

document system (ADAMS). The NRC's document system is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

We will gladly discuss any questions you may have regarding this inspection.

Sincerely,

/RA by W. Snell Acting for/

Jamnes L. Cameron, Chief
Decommissioning Branch

Docket No. 072-00037
License No. DPR-19; DPR-25

Enclosure:
Inspection Report 072-00037/06-01(DNMS)

cc w/encl: Site Vice President - Dresden Nuclear Power Station
Dresden Nuclear Power Station Plant Manager
Regulatory Assurance Manager - Dresden
Chief Operating Officer
Senior Vice President - Nuclear Services
Senior Vice President - Mid-West Regional Operating Group
Vice President - Mid-West Operations Support
Vice President - Licensing and Regulatory Affairs
Director Licensing - Mid-West Regional Operating Group
Manager Licensing - Dresden and Quad Cities
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Letter to Christopher M. Crane from Jamnes L. Cameron dated December 20, 2006

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3
NRC INSPECTION REPORT 072-00037/06-01(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.	072-00037
License Nos.	DPR-19; DPR-25
Report No.	072-00037/06-01(DNMS)
Licensee:	Exelon Generation Company, LLC
Facility:	Dresden Nuclear Power Station, Units 2 and 3
Location:	4300 Winfield Road Warrenville, IL 60555
Dates:	Onsite: June 1, 2006; August 16, 2006; September 12, 2006; and September 19, 2006 Final Telephone Exit: December 12, 2006
Inspector:	Magdalena Gryglak, Reactor Inspector
Approved by:	Jamnes L. Cameron, Chief Decommissioning Branch Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Dresden Nuclear Power Station
NRC Inspection Report 072-00037/06-01(DNMS)

The purpose of the inspection was to observe and evaluate the licensee's activities associated with construction of a dry cask storage overpack and the new Independent Spent Fuel Storage Installation (ISFSI) pad. The inspector also reviewed the design of the new pad to ensure compliance with the regulations and the design specifications.

Independent Spent Fuel Storage Pad Construction

- The inspector concluded that the construction of the HI-STORM 100 concrete storage overpack complied with the structural provisions contained in the Final Safety Analysis Report (FSAR) and the overpack design specifications. (Section 1.1)

- The inspector concluded that the construction activities of the concrete pad complied with the structural provisions specified in the FSAR and the licensee's approved ISFSI Work Planning Instructions. The material and batch plant certification records were adequate. (Section 1.2)

- The inspector concluded that the licensee adequately evaluated the proposed transfer route for the expected dry cask loads. (Section 1.3)

Review of 10 CFR 72.212(b) Evaluations, Appendix A, Review of ISFSI Storage Pad Design

- The inspector concluded that the licensee adequately characterized the subsurface conditions at the new ISFSI site and the preliminary site work was conducted in accordance with the licensee's procedures and specifications. The licensee complied with the design analyses in the provisions prescribed in the Certificate of Compliance, the FSAR, and the 10 CFR Part 72 requirements. (Section 2.1)

Report Details

1.0 Independent Spent Fuel Storage Pad Construction (60853)

1.1 Fabrication of storage overpacks

a. Inspection Scope:

The inspector evaluated construction of the HI-STORM 100 concrete storage overpacks to verify the licensee complied with the structural provisions of "The Final Safety Analysis Report" (FSAR) for the Holtec International Storage and Transfer Operation Reinforced Module Cask System (HI-STORM 100 Cask System), Revision 3, and the licensee's approved specifications.

b. Observations and Findings:

The inspector observed the last stage of fabrication of a HI-STORM 100 overpack shell which consisted of placing concrete inside the steel shell. The concrete was delivered in truck agitator units and discharged through a chute to obtain an unrestricted vertical drop in order to prevent aggregate segregation. The crew placed the concrete in layers that were two feet in elevation. After completion of each layer in the four quadrants of the circle, the workers used a vibrator to ensure proper consolidation of the concrete. During this activity, the inspector observed that the crew did not vibrate the concrete systematically, at the specified distance and angle. The inspector conveyed this observation to the foreman who immediately took corrective actions educating and demonstrating to the crew members the proper vibration technique.

During the placement of the concrete, qualified personnel performed unit weight, temperature, and slump tests for each concrete batch as specified by the applicable American Concrete Institute (ACI) standards. The inspector observed that the field test results satisfied the specified design requirements. In addition, the personnel sampled and collected three sets of cylinders. The cylinders were cured and tested after 28 days by an independent laboratory to measure the compressive strength of the concrete. The inspector verified that all cylinders met the FSAR specified minimum compressive strenght of 3300 pounds per square inch (psi).

The inspector observed that sufficient supervisory oversight was provided at the job site. A Holtec representative directed the work activities and supervised the independent contractor who performed the actual concrete placement activities. The licensee provided additional oversight to assist and monitor the work progress.

c. Conclusions:

The inspector concluded that the construction of the HI-STORM 100 concrete storage overpack complied with the structural provisions contained in the FSAR and the overpack design specifications.

1.2 Pad Construction Activities

a. Scope:

The inspector evaluated whether construction activities for the Independent Spent Fuel Storage Installation (ISFSI) concrete pad complied with the structural provisions specified in the FSAR and the licensee's approved Work Planning Instructions. The inspector also reviewed material and the batch plant certification records.

b. Observations and Findings:

The inspector reviewed the ISFSI Work Planning Instructions which delineated responsibilities and provided specifications for the pad construction activities. The pad construction activities were performed in accordance with ACI 304R. The inspector observed the preparation of the pad before the concrete placement commenced. The inspector verified the correct size rebar was purchased and placed in accordance with the design drawings. The inspector also observed that the forms were properly installed with no loose components and the area was free of debris and moisture.

The licensee constructed the pad in three segments due to its size. The inspector observed portions of the first and third segments being constructed. The concrete was transported by conveyor belt and discharged through a chute to its final position. The inspector observed the crew ensure that concrete had an unrestricted vertical drop to the point of placement to prevent aggregate segregation. During the construction of the second half of the third segment, the inspector observed that the crew did not fully control the chute to minimize aggregate segregation. The inspector informed the cognizant licensee individual of the problem. The crew immediately addressed the issue and maintained better control of the chute. The inspector observed the crew use a systematic pattern of vibration to ensure proper consolidation. There were additional crew members who ensured the concrete was properly vibrated near the sides and corners. Later, after the forms were removed, the inspector verified that the concrete was well consolidated and that there were no aggregate exposed or air voids present. During the construction activities, the inspector observed that the cognizant engineers verified truck batch tickets and the preliminary test results to ensure that each concrete batch mix was consistent with the design specifications and that it was suitable for placement.

During the placement of the concrete, qualified personnel performed unit weight, temperature, air content, and slump tests for each concrete batch as specified by the applicable ACI standards and the licensee's design specifications. The inspector observed that the field test results satisfied the specified design requirements. In addition, the personnel sampled and collected concrete cylinders to perform break tests. The cylinders were cured and tested after 28 days by an independent laboratory to measure the compressive strength of the concrete. The inspector verified that most cylinders met the FSAR specified minimum compressive strenght of 3000 psi and maximum of 4200 psi. One set of cylinders slightly exceeded the maximum compressive strenght criteria. The inspector confirmed that the licensee would revise the non-mechanistic tip over analysis for the cask to verify that based on the higher concrete compressive strength test results, the cask deceleration value did not exceed the FSAR specified 45 g (see Section 2.0 of this report). The inspector also reviewed

results of the compressive strenght tests performed on samples taken during placement of the concrete mud mat. The results satisfied the design specifications.

The inspector observed the crew finish and cure the concrete. The crew used a broom with ridges to ensure that surface of the pad met the FSAR specified coefficient of friction criterium. After the broom finish, the crew applied a chemical compound to cure the concrete. During the placement and curing of the third segment, the ambient temperature fell to approximately 30 degrees Fahrenheit. The inspector observed the licensee install a thermocouple to monitor the temperature of the concrete overnight. The inspector verified that the temperature of the concrete stayed within the ACI code allowable temperature range.

The inspector reviewed certification for the following materials used that could affect the quality of the concrete pad and its design function: 1) the rebar; 2) aggregates; 3) cement; and 4) structural fill. The inspector verified that the materials used were tested in accordance with applicable codes and met design requirements. The inspector also reviewed documentation regarding the ready mix batch plant certification which was certified in accordance with the Illinois Department of Transportation specifications. The inspector reviewed quality control records including instrument calibration, concrete plant surveys, and delivery truck inspection records. The material and batch plant certification records were adequate.

The inspector observed that sufficient supervisory oversight was provided at the job site. There were multiple levels of supervision including contractors and licensee representatives.

c. Conclusion:

The inspector concluded that the construction activities of the concrete pad complied with the structural provisions specified in the FSAR and the licensee's approved ISFSI Work Planning Instructions. The material and batch plant certification records were adequate.

1.3 Dry Cask Transfer Route

a. Scope:

The inspector reviewed the licensee's evaluation of the new transportation route from the reactor building to the new pad to verify that the licensee evaluated the proposed transfer route for the expected loads.

b. Observations and Findings:

The licensee initially characterized the route and identified all of the buried commodities that were present. There was a number of water supply and discharge lines as well as some electrical conduits present. The licensee's analysis demonstrated the all of the buried commodities would withstand the imposed loads and did not need protection. The licensee added reinforcement to the section of the transportation route where the Low Profile Transporter will be used to move the cask out of the reactor building.

To protect the surface of the transportation route which was covered with asphalt, the licensee installed “turning pads” in the areas where the heavy transporter will make sharp turns. The licensee excavated the soil, backfilled the area and placed concrete pads to minimize surface damage from the crawler blades.

c. Conclusions:

The inspector concluded that the licensee adequately evaluated the proposed transfer route for the expected dry cask loads.

2.0 Review of 10 CFR 72.212 (b) Evaluations, Appendix A, and Independent Spent Fuel Storage Installation (ISFSI) Storage Pad Design (60856)

2.1 Pad Subsurface Conditions and Design of the ISFSI Pad

a. Inspection Scope:

The inspector evaluated the licensee’s site characterization, engineering design analyses, and preliminary site work for a new dry cask storage pad to verify that the licensee complied with the Certificate of Compliance, the FSAR, 10 CFR Part 72 requirements and its procedures and specifications.

b. Observations and Findings:

The licensee selected an area in the south west corner of the site controlled area for the new ISFSI pad. To determine the site soil profile and test its characteristics, the licensee’s contractor drilled five soil borings in the area selected for the new pad. The inspector reviewed the licensee’s report and the soil boring test results. The soil sample analysis demonstrated that the site conditions generally consisted of approximately 1 foot of asphalt underlain by 1.5 to 2 feet of undocumented fill followed by sand and silt. Based on the soil boring results, the inspector determined that the site was located on a very shallow sandstone which was encountered at approximately 5 feet below the existing grade. Due to the shallow bedrock underneath the pad and the replacement of the in situ soils, the inspector determined that soil liquefaction and soil settlement are not a concern. Due to the close proximity of the new pad to the plant structure and similarities in soil profiles as well as elevations for both structures, the pad horizontal and vertical seismic accelerations are comparable to the site Design Basis Earthquake horizontal and vertical accelerations of 0.2 g and 0.133 g, respectively. The inspector confirmed that the pad site specific seismic ground motion acceleration is bound by the cask design basis seismic ground motion acceleration of 0.47 g horizontal and 0.3 g vertical. The licensee also performed a detailed characterization of the area to identify any underground commodities. Some commodities that had been abandoned due to the demolition of a training building which was once located in the area, were uncovered and excavated or capped. Other commodities which were still functional such as oxygen and hydrogen piping as well as some grounding and power cables were left in place. The inspector verified that the licensee protected the oxygen and hydrogen lines by encasing them in Polyvinyl Chloride (PVC) pipes reinforced with spacers and vented to the atmosphere to prevent accumulation of gases in the lines. The vents were clearly identified with markers placed above the buried pipes. The inspector confirmed that the licensee analyzed the hydrogen and oxygen lines for the static and dynamic loads that would be imposed on them.

The inspector reviewed pad design drawings. Due to the variety of soils and the presence of organic material that could create the potential for soil compression under load, the licensee decided to remove all of the subsurface material and replace it with controlled compacted structural fill. The licensee's contractor excavated the soil down to approximately 5 feet below grade and placed approximately 3 feet of structural fill. The inspector verified that the structural fill was placed in 6-inch layers and compacted in accordance with applicable standards. Following the placement of structural fill, the design specified placement of a 6-inch concrete mud mat on top of which rested the 2-foot concrete ISFSI pad.

The inspector reviewed the licensee's activities to address frost heave during cold weather due to a high water table in the area. The licensee addressed the potential for frost heave by installing a tile drainage system around the perimeter of the pad so that the water could drain freely to the tile drain and be discharged into a discharge canal outside of the protected area. In addition, the selection of the controlled off-site material as the structural fill will aid the drainage process.

The licensee's contractor performed plate load tests to determine the modulus of subgrade reaction (k) of the structural fill in order to obtain the soil Modulus of Elasticity (E). The plate load test is a field test to determine the structural fill bearing capacity, as well as the settlement for a given loading condition and a given depth. The inspector reviewed the licensee's initial and final plate load test results. Based on the site specific soil conditions and the structural fill material originally to be placed, the licensee needed to achieve an E value in the range of 7 to 10 kips (ksi). However, final plate load tests resulted in an E value of approximately 12 ksi which was above the range specified in the design. The licensee decided to revise its design and increase the allowable Modulus of Elasticity of the structural fill in place. The inspector verified that the new Modulus of Elasticity met the FSAR limit of 28 ksi.

The pad was designed in accordance with ACI 318-95. The inspector reviewed the licensee's structural design analysis. The licensee considered normal operating loads (dead load and life load) and accident loads including seismic loads. The inspector reviewed the assumptions, results, and conclusions contained in the analysis and concluded the structural fill had adequate bearing pressure capacity to support the static and dynamic loads resulting from the normal and accident conditions. The licensee also analyzed the pad energy absorption capacity to ensure the cask deceleration value did not exceed the FSAR limit. Due to the final plate load test results and the concrete cylinder break test results, the licensee decided to revise the cask non-mechanistic tip over analysis to account for the changes in the design input parameters. The inspector verified through interviews that the preliminary analysis which contained the new design input parameters demonstrated that the cask deceleration value did not exceed the maximum 45 g design basis deceleration specified in the FSAR.

c. Conclusions:

The inspector concluded that the licensee adequately characterized the subsurface conditions at the new ISFSI site and the preliminary site work was conducted in accordance with the licensee's procedures and specifications. The licensee complied with the design analyses in the provisions prescribed in the Certificate of Compliance, the FSAR, and the 10 CFR Part 72 requirements.

3.0 Exit Meeting Summary

On December 12, 2006, the inspector conducted a final exit meeting by telephone to present the final results of the inspection. The licensee acknowledged the findings presented and did not identify any information discussed as being proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

* K. Hunter	Dry Cask Storage Project Engineer
* J. Griffin	Licensing Coordinator

* Persons present during the December 12, 2006, telephone exit meeting.

INSPECTION PROCEDURES USED

IP 60853	Construction of an Independent Spent Fuel Storage Installation
IP 60856	Review of 10 CFR 72.212 SUPPLEMENTAL INFORMATION (b) Evaluations, Appendix A, Review of ISFSI Storage Pad Design

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	None
Closed	None
Discussed	None

LIST OF DOCUMENTS REVIEWED

Component Completion Record, HI-STORM 100S Version B Overpack, Cylinder break test results, dated July 5, 2006

Procedure, HSP-170, Ready Mix Concrete and Grout Requirements for its “B” Applications, Revision 31, dated June 20, 2006

Calculation, CC-AA-309-1001, DRE06-0007, Design of Independent Spent Fuel Storage Installation (ISFSI) Reinforced Pad for Dry Cask Storage Project, Revision 0, dated March 10, 2006

Work Planning Instruction, EC 358290, Dresden Station-Units 1,2,& 3, Installation of ISFSI Pad West

Design Consideration Summary, EC 358290, Installation of ISFSI Pad West, Revision 0
Evaluation 50.59, Installation of ISFSI Pad West, Revision 0

Screening 50.59, 2006-0070, Engineering Change 358290, Revision 0

Calculation, DRE97-0200, Attachment 2, Evaluation of Onsite Transportation Route, Dresden Unit 2 and 3, Revision 2, dated March 10, 2006

Repot of Concrete Compression Test Results, ISFSI Pad, dated September 13, September 24, and September October 10, 2006

Repot of Concrete Compression Test Results, Mud Mat, August 9, 2006

Report of Field Compaction Tests

Personnel Qualification Records, dated April 27, 2004

Reinforcement Bar Certification

Certification, Material Test Results; aggregate, dated May 5, 2006

Certification, Mill Test Report, Portland Cement-Type I; dated May 18, 2006

Inspection Records, Batch Plant Certification, dated March 1, 2006

Batch Tickets, No. 92451, 92452, 92453, 92454, 92435, 93436, 92437, September 19, 2006

Certification, Test Results for Structural Fill, 079CM-18, dated April 13, 2006

Final Plate Load Test Result on the Structural Fill, dated June 20, 2006 and June 26, 2006

Soil Boring Report, dated November 16, 2005

LIST OF ACRONYMS USED

ACI	American Concrete Institute
CFR	Code of Federal Regulations
E	Modulus of Elasticity
FSAR	Final Safety Analysis Report
g	acceleration due to gravity
ISFSI	Independent Spent Fuel Storage Installation
ksi	kips per square inch
psi	pounds per square inch